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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Docking Station

(72) Nickol, Harald - Germany (Federal Republic of) ;

(71) Same as inventor

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Notice: This application is as filed and may therefore contain an incomplete specification.



Industrie Canada Industry Canada

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ABSTRACT

To reduce overuse of built-in connectors of a pocket computer an adapter or docking station is provided. The docking station defines a receptacle, i.e., a recess, having a size and shape complementary with the computer with which it will be used. This receptacle has, located in the side wall(s) thereof, connector(s) which are complementary to the connectors provided on the exterior of the computer. The docking station includes a switchable internal interface, at least one built-in piece of peripheral equipment in modular form, and at least one connector for coupling to an external data source or user. The switchable internal interface, in a preferred embodiment, may be used to selectively establish communication between any two of the computer, the built-in peripheral and the external connector.

What is Claimed is:

1. A docking station for a pocket computer, said docking station comprising:

5 a first external interface for establishing a detachable data exchange connection with a pocket computer;

 at least a second external interface for establishing a data transfer connection with an external electronic device;

10 a function element, said function element storing or transmitting data; and

 a switchable interface for selectively establishing data flow paths between said first external interface and either of said second external interface or said function element.

15 2. The docking station of claim 1 wherein said internal interface comprises switch means and wherein said switch means selectively establishes a data flow path between any two of said first external interface, second external interface and function element.

20 3. The docking station of claim 1 wherein said internal interface operates under the control of a pocket computer connected to said docking station by means of said first external interface.

25 4. The apparatus of claim 2 wherein said switch means comprises an electronic switch which operates under software control in response to command signals provided by a computer connected to said docking station by means of said first external interface.

30 5. The docking station of claim 1 wherein said function element comprises a modem.

35 6. The docking station of claim 5 wherein said modem is a radio modem and wherein said docking station further comprises a third external interface for connecting said radio modem to an antenna.

7. The docking station of claim 1 wherein said function element comprises a hard disc data storage device.

8. The docking station of claim 1 further comprising:

5 data conditioning means connected between said first external interface and said internal interface for conditioning the data flow path whereby data exported from and imported to a computer connected to the docking station via said first external interface is in a form compatible with said second external interface.

9. The docking station of claim 1 wherein said 10 second external interface is a standardized interface for serial data transmission.

10. The docking station of claim 1 further comprising:

15 driver means connected between said internal interface and said second external interface.

11. The docking station of claim 1 further comprising:

20 power supply means, said power supply means providing power for operating said function element and said internal interface; and

25 a power supply interface compatible with a power supply connection on the pocket computer, said power supply connector being positioned so as to be in operative engagement with an external power supply connector on the computer when the computer is engaged with said first external interface whereby said power supply means may supply operating power to the computer.

12. The docking station of claim 11 wherein said 30 power supply means includes a source of direct current.

13. The docking station of claim 4 further comprising:

35 power supply means, said power supply means providing power for operating said function element and said internal interface; and

a power supply interface compatible with a power supply connection on the pocket computer, said power supply connector being positioned so as to be in operative engagement with an external power supply connector on the computer when the computer is engaged

with said first external interface whereby said power supply means may supply operating power to the computer.

14. The docking station of claim 13 wherein said power supply means includes a source of direct current.

5 15. The docking station of claim 14 wherein said second external interface is a standardized interface for serial data transmission.

16. The docking station of claim 15 wherein said function element comprises a modem.

10 17. The docking station of claim 16 wherein said modem is a radio modem and wherein said docking station further comprises a third external interface for connecting said radio modem to an antenna.

15 18. The docking station of claim 15 further comprising:

20 data conditioning means connected between said first external interface and said internal interface for conditioning the data flow path whereby data exported from and imported to a computer connected to the docking station via said first external interface is in a form compatible with said second external interface.

19. The docking station of claim 18 wherein said function element comprises a modem.

25 20. The docking station of claim 1 wherein said docking station further includes: a housing, said switchable interfaces and function element being mounted within said housing, said first and second interface being mounted on exterior side surfaces of said housing, said housing defining a recess commensurate in shape
30 with a pocket computer to be received therein, said first interface being located in a wall which in part defines said recess.

Fetherstonhaugh & Co.,
Ottawa, Canada
Patent Agents

DOCKING STATION

Background of the Invention1. Field of the Invention

5 The present invention relates to computer docking stations and particularly to adaptors by which "pocket" computers may be coupled to various items of peripheral equipment. More specifically, this invention is directed to a receiver having a physical structure and electrical connectors which are complementary to a
10 pocket computer whereby the pocket computer may be inserted in the receiver and data thereafter exported from or imported to the computer via the receiver. Accordingly, the general objects of the present invention are to provide novel and improved apparatus of
15 such character.

2. Description of the Prior Art

As a consequence of their compactness and high performance, so-called pocket computers are increasingly used today in mobile applications where, as in the case
20 of desk-top personal computers, they considerably simplify the processing and handling of business events. Compactness, of course, also precipitates certain challenges, particularly with regard to the importing of data from external sources and the exporting of data to
25 peripheral equipment and other data processors. Such import and export of data, i.e., so-called E-Mail, can be accomplished in the case of a pocket computer through the use of plug-in connectors which, typically through
30 cabling, couple the computer to a modem, a PC or some other peripheral device. Because of space considerations, such plug-in connectors will ordinarily permit a pocket computer to be associated with only one external device at a time. This limitation, in
35 practice, has resulted in very heavy use of the built-in connectors of the pocket computer. The connectors are thus subject to considerable stress which can lead to early failure.

Summary of the Invention

40 The present invention overcomes the above-briefly discussed and other deficiencies and disadvantages of the prior art by providing a novel and improved docking

station particularly well suited for pocket computers. A docking station in accordance with the invention defines a receptacle, i.e., a recess, having a size and shape complementary with the computer with which it will be used. This receptacle has, located in the side wall(s) thereof, connector(s) which are complementary to the connectors provided on the exterior of the computer. The docking station includes a switchable internal interface, at least one built-in piece of peripheral equipment in modular form, and at least one connector for coupling to an external data source or user. The switchable internal interface, in a preferred embodiment, may be used to selectively establish communication between any two of the computer, the built-in peripheral and the external connector.

The present invention, in the preferred embodiment, is thus a docking station for a pocket computer which provides a switchable data flow path from the computer to either an inbuilt function element or to at least one external interface whereby data transfer between the computer and another device may be accomplished. The switchable connection is thus an internal interface which selectively closes or interrupts the data flow path between a docked pocket computer and at least one of a number of communication partners which are simultaneously connected to the pocket computer via the docking station. The internal interface will isolate the built-in function element, docked computer and external interface from one another in a manner consistent with the communication mode which has been selected. In the preferred embodiment, this isolation ensures that parallel data flow paths cannot be established.

Brief Description of the Drawings

The present invention may be better understood and its numerous objects and advantages will become apparent to those skilled in the art by reference to the accompanying drawings wherein like reference numerals

refer to like elements in the several figures and in which:

Figure 1 is a schematic showing of a docking station in accordance with a preferred embodiment of the invention;

Figures 2a - 2d schematically illustrate various open and closed data flow paths which may be established within the docking station of Figure 1;

Figures 3a and 3b are respectively top plan and side elevation views of the docking station of Figure 1; and

Figure 4 is a perspective view of the docking station of Figures 1 and 3 with a pocket computer received therein.

Description of the Disclosed Embodiment

With reference to the accompanying drawings, a docking station in accordance with the invention is indicated generally at 1. Docking station 1 is configured so as to define a recess 4 in the top surface thereof. This recess is commensurate in size and shape with a pocket computer 2. As will be obvious to those skilled in the art, taking into account the small size of the pocket computer 2, docking station 2 will also be portable so that it may be transported along with the computer thus enabling the docking station 2 to function as a mobile communications station.

The docking station 1 comprises a housing 3 which has the above-mentioned recess 4 for accommodating computer 2. Within the area of recess 4, specifically in a side wall portion, docking station 1 is provided with a first external interface which is indicated schematically at 5. Interface 5 will be in the form of a connector which is complementary to the connector which defines a data port on computer 2. The first external interface 5 is positioned such that it is aligned with the cooperating interface of computer 2 when the computer is inserted into recess 4. Thus, insertion of computer 2 into recess 4 establishes a data

and instruction transfer relationship between computer 2 and docking station 1.

5 Docking station 1 also has at least a second external interface, indicated schematically at 6, on housing 3. The second external interface 6 is preferably a standard Rs232 connector, i.e., a serial data port, of the type conventionally employed to couple computers to peripheral devices or other computers.

10 As schematically represented in Figure 1, docking station 1 has a modular internal configuration. A first module 7 of docking station 1 includes an interface switch 8 for selectively establishing communication between the three data flow paths which have been generally indicated at I, II and III. In each
15 operational mode of switch 8, certain communication paths are interrupted, i.e., opened, while others are closed. Switch 8 also has a state in which all communication paths are open.

20 Continuing to refer to Figure 1, the data flow path I extends from a first connector, indicated schematically at 9, of the interface switch 8 to the first external interface, i.e. the connector or port 5. Data flow path I thus includes serially connected conductors 10, 11 and 12. Data flow path II extends
25 from a second connector 13 on interface switch 8 to a "function element" module 16 which is integrated into docking station 1. Thus, data flow path II includes serially connected conductors 14 and 15. The third data flow path III extends between a third connector 17 of
30 interface switch 8 to the second external interface 6 and thus includes serially connected conductors 18 and 19. For purposes of illustration, the interface switch 8 has been schematically shown as including a physically movable switch member 20 which selectively establishes
35 electrical connections between any two of the connectors 9, 13 and 17. The various modes of operation which may be established by means of interface switch 8 are illustrated in Figure 2 and will be briefly discussed below.

It is to be understood that, while the interface switch 8 has been schematically represented as a mechanical switching device including the switching member 20, in actual practice interface switch 8 will be an electronic switch which operates under software control. Control over the mode of operation of interface switch 8 may be achieved through use of the computer 2 and, for this purpose, command signals will be transmitted to switch 8 from the first external interface 5 via serially connected conductors 21 and 22.

In the disclosed embodiment of the invention, the "function element" 16 is in the form of a radio modem having an antenna 23. Antenna 23 is connected to the radio modem via a connector, indicated schematically at 24, in the housing 3 of docking station 1. The use of a radio modem and antenna 23 allows wireless communication between the pocket computer 2 and other apparatus. As an alternative to a modem, function element 16 may be a hard disk which functions as an external memory for computer 2.

The internal interface of docking station 1, i.e., the electronics module 7 which includes the interface switch 8, may also have a driver which conditions the data to be exported to the form required by the second external interface 6 or a peripheral device connected to interface 6.

Docking station 1 is further provided with a interface adapter or converter 25 for data conditioning which is connected between modul 7 and the first external interface 5. Since the standard of the interface on the pocket computer 2 may differ from that of the communications partners included in or coupled to docking station 1, a converter 25 may be required to condition data for transmission between computer 2 and switch 8. Thus, as schematically illustrated, the converter 5, when provided, is connected in data flow path I and is also in series with conductors 12 and 22.

The electronics within docking station 1 are provided with operating power via a power supply 26

which provides current at the appropriate regulated voltage(s) on conductors 27, 28 and 29. Power supply 26 is also preferably coupled to computer 2 via conductor 30 and a plug-in connector 31 which mates with the external power supply input connector on computer 2 when the computer is mounted in the docking station. Power supply 26 may be connected to a suitable external power source via a plug-in connector 32 on housing 3. As noted, docking station 1 is preferably also a portable device and thus may be provided with a rechargeable battery 33 which provides operating power. When connected to the docking station, the rechargeable batteries in computer 2 may be recharged via power supply 26 if the docking station is itself connected to an external power source.

Referring to Figures 2a to 2d, the various possible combinations for setting up communication paths using docking station 1 will now be described. The modular configuration of docking station 1 allows the communication partners, i.e., the computer 2, the function element 16 and the external interface 6, to be addressed individually. In Figure 2 for purposes of explanation, the external interface 6, i.e., the Rs232 port, is used to couple the docking station 1 to a PC 34. Also, in Figure 2 the function element 16 is a modem.

As represented in Figure 2a, when data switch 8 establishes a data flow path between its connectors 9 and 13, communication is established between the pocket computer 2 and the modem 16. In this operating state of switch 8, the pocket computer 2 and modem 16 are isolated from PC 34. Accordingly, data may be exported from or imported to the pocket computer 2 via the modem 16. As will be obvious to those skilled in the art, modem 16 may be either a radio modem, as schematically represented in Figure 1, or a modem which is connected to a telephone line via a cable which plugs into connector 24.

Referring to Figure 2b, when switch 8 establishes a data flow path between its connectors 9 and 17, the pocket computer 2 is coupled to PC 34 and isolated from modem 16. In this state of switch 8, data may be exchanged between pocket computer 2 and PC 34.

In the Figure 2c state of switch 8, the connectors 13 and 17 of the switch are connected and two way data communication is thus established between modem 16 and PC 34. Under these conditions, the pocket computer 2 is isolated from both the PC 34 and modem 16. In the Figure 2c state of switch 8, the pocket computer cannot transmit or receive data but can, via conductors 12, 22 and 21, exercise control over switch 8.

Finally, switch 8 may be caused to assume the state depicted in Figure 2d where the pocket computer 2, modem 16 and PC 34 are respectively isolated from one another. In the Figure 2d state, both of the pocket computer 2 and the PC 34, or other device connected to external interface 6, can be employed in a stand alone mode.

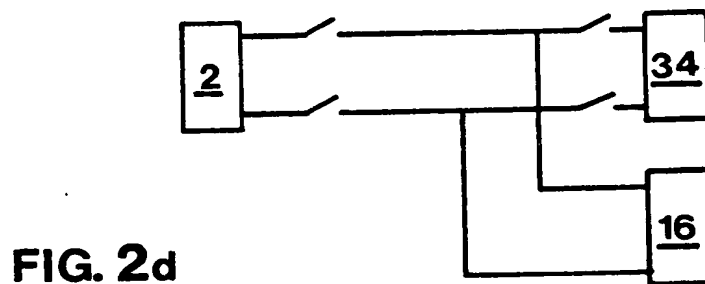
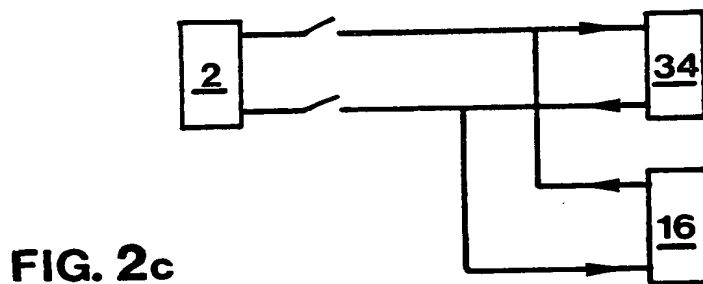
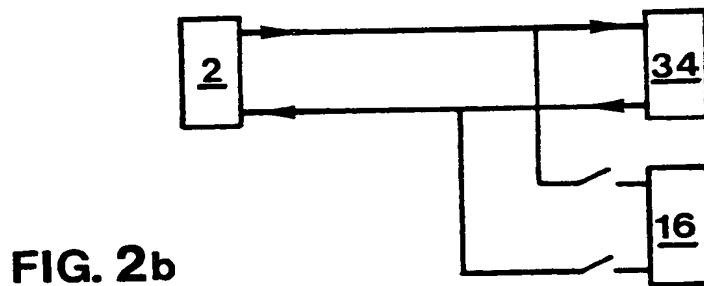
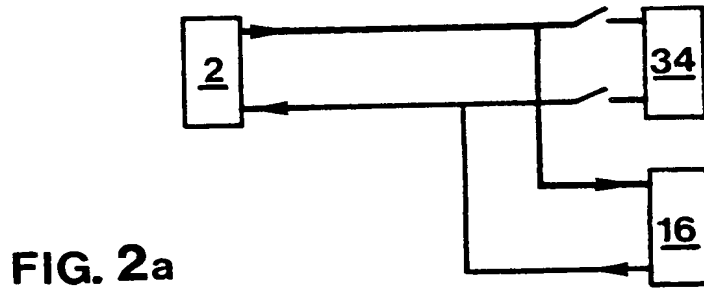
As will also be obvious to those skilled in the art, docking station 1 may be provided with a further external interface, similar to interface 6, which can be employed to establish communications with other peripheral devices such as, for example, a printer, monitor or full size keyboard. If such a further external interface is provided, the docking station 1 will be provided with a fourth data flow path and the switch 8 will be employed to selectively establish communication with such a fourth data flow path. It is also to be noted that, rather than employing a modem 16 and hard disc as alternatives, the docking station 1 may have both devices as built-in modules.

As described above, the internal interface of docking station 1, i.e., the module 7 with its switch 8, allows a docked pocket computer to communicate with other electronic devices, such as modems, PCs or peripheral devices, without complex connecting and/or detaching of cabling. The switchable internal interface can also be employed to selectively establish

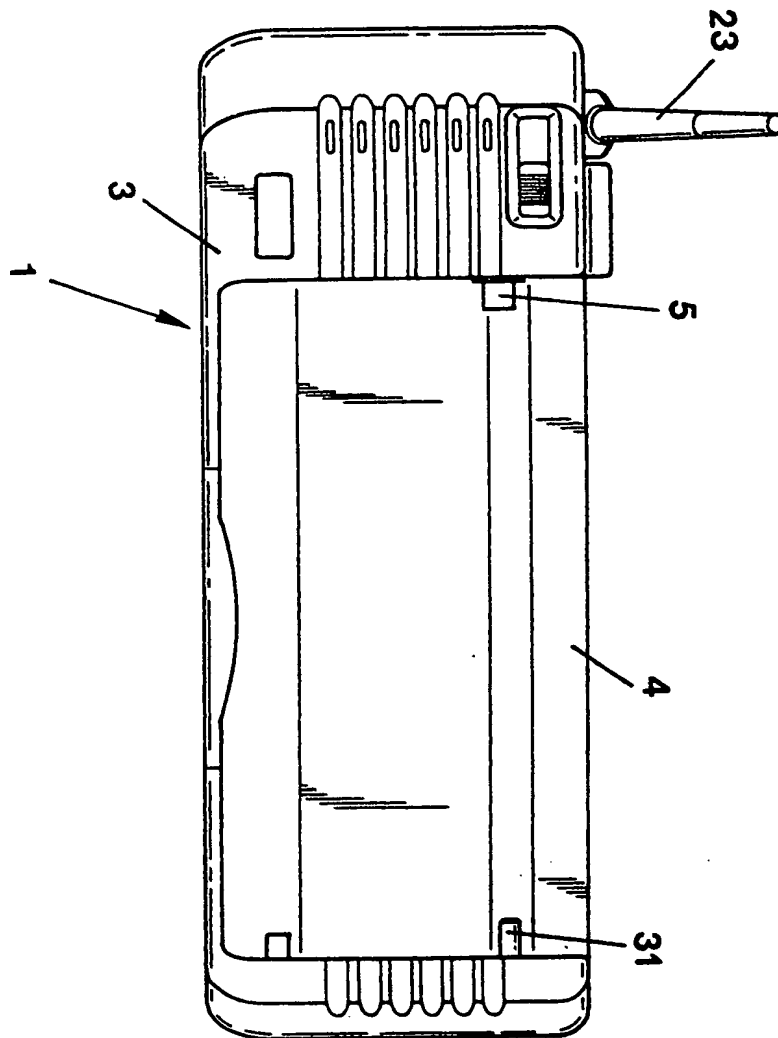
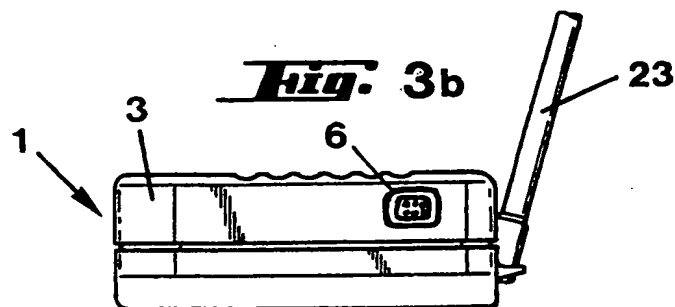
communication between the associated electronic devices under the control of the docked computer. Further, the switchable internal interface can isolate the electronic devices from one another so that each can operate independently. The docking station 1, particularly if provided with both a modem and hard disc, or if in the configuration of Figure 2b with a peripheral device having data storage capability coupled to external interface 6, can function as an electronic mailbox for pocket computer 2.

As described above, in the preferred embodiment of the invention, the function element 16 is a modem, particularly a radio modem with attachable antenna, which provides for remote transmission of data from or to pocket computer 2. Accordingly, docking station 1 may function as a mobile communication instrument by means of which data can be transmitted, received and processed by pocket computer 2 at virtually any time or place, i.e., the computer 2 and docking station 1 form a mobile unit which can communicate, location and time independently, with other communication partners such as a stationary PC or a facsimile machine.

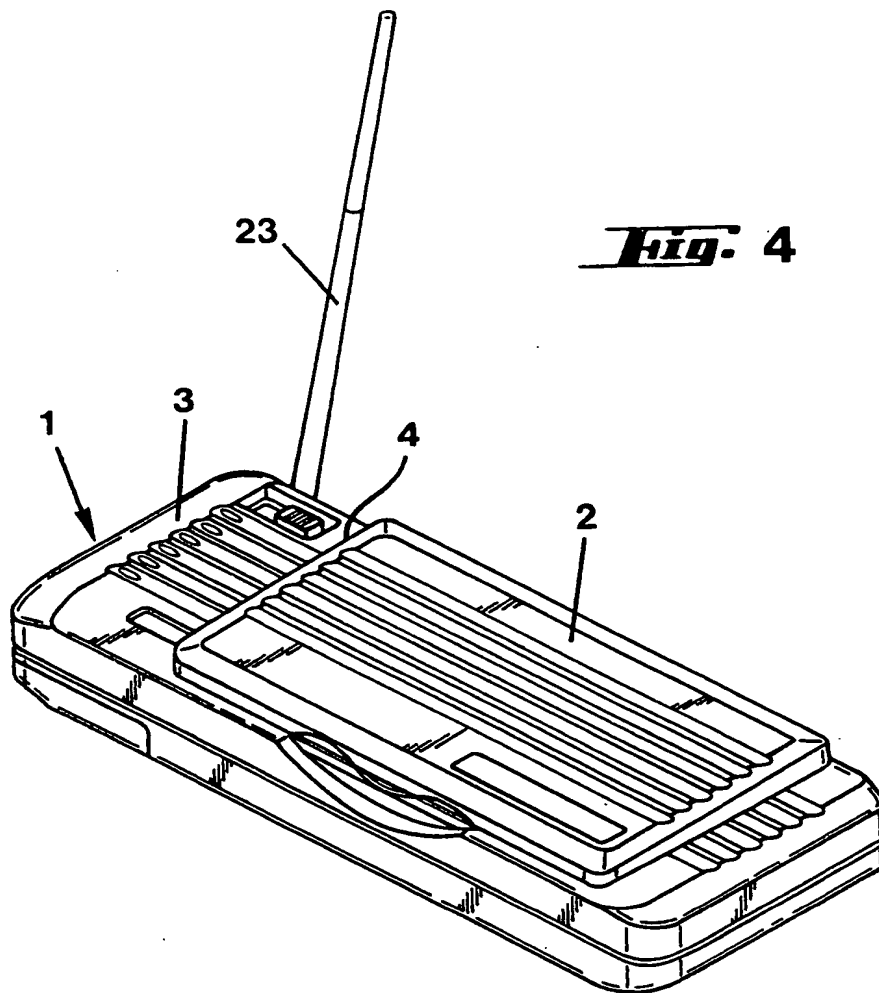
While preferred embodiments have been shown or described, various modification and substitutions may be made thereto without departing from the spirit and scope of the invention. Accordingly, it is to be understood that the present invention has been described by way of illustration and not limitation.



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Fig. 3a**Fig. 3b**

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***Fig. 4***

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